



DEFENSE ENERGY SUPPORT CENTER

# Tank Ships



# Tank Barges



# Land Storage Tanks



# Rail Cars / Tank Trucks



# Laboratory Activities



# QR Activities PID Monitoring

<b>• <u>Activity</u></b>	<b><u>Loading</u></b>	<b><u>Discharge</u></b>	<b><u>Sampling</u></b>	<b><u>Gauging</u></b>	<b><u>CS</u></b>
• <b>Tank Ships</b>	*	*	*	*	*
• <b>Tank Barges</b>	*	*	*	*	*
• <b>Rail Cars</b>	*	*	*	*	
• <b>Tank Trucks</b>	*	*	*	*	
• <b>Shore Tanks</b>	*	*	*	*	*
• <b>Fuel Transfers</b>					
• <b>INTO Plane</b>					
• <b>Laboratory</b>					
• <b>Pipe Lines</b>					
• <b>Fuel Manifolds</b>					

# **Organizations that classify Toxic Substances**

- **OSHA (PEL's) The law, no review 1962**
- **ACGIH (TLV's) Recommendation, annual review**
- **OEL (USAF)**
- **These exposure levels are TWA's: 8 hour work day, 40 hour work week**

# TLV / PEL / OEL

- **TLV:** Concentration of a contaminant that should not be exceeded during a 8 hr. workday and a 40 hr. work week (TWA)
- **PEL / OEL:** Same as a TLV
- **STEL:** 15 minute exposure; one hour between exposures, four per day.
- **Ceiling:** Should never exceed this level

# **Diesel Fuel / Jet Fuel: Additions to ACGIH TLV Guide**

- **TLV Diesel: 15 ppm-Skin Notation (S)  
August 2002**
- **Jet Fuel: 30 ppm-Skin Notation (S)  
• June 2003**

## **Effects of proposed TLV**

- **1. Prolonged ventilation before entry**
- **2. Respiratory Protection for  
personnel?**
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# Photoionization Detector



# 3rd Generation Digital Instrument: O<sub>2</sub>, CGI, CO, H<sub>2</sub>S, PID



# **Advantages of Photo Ionization Detector: Multi Rae Plus**

- **Will monitor exposures throughout a space**
- **Will monitor 99% of the possible workplace contaminants, excellent for fuels**
- **Will give Peak Exposures**
- **Will give running time**
- **Small, very portable**
- **Low maintenance**
- **Will give a Time Weighted Average (TWA)**
- **Accuracy: +/- 2 ppm**

# Potential toxic contaminants in the DESC workplace?

- **JP-8: (*Exxon MSDS*) 100 ppm**
- **JP-5: (*Exxon MSDS*) 100 ppm**
- **Ethyl Benzene: (ACGIH *TLV*) 100 ppm**
- **Ethyl Alcohol: (ACGIH) *TLV* 1000 ppm**
- **Toluene: (suspected) (ACGIH *TLV*) 50 ppm**
- **Diesel Fuel: 15 ppm (August 2002)**
- **Jet Fuel: 30 ppm (July 2003)**

# Potential toxic contaminants in the DESC/DCMA workplace?

- Fuel additives ?

1. *\*Xylene: TLV=100ppm,*
  2. *\*Trimethyl Benzene: TLV=25 ppm,*
  3. *\*Isopropynol: TLV=400 ppm,*
  4. *\*Ethylene Glycol)*
  5. *\* Ethanol: TLV=1000 ppm*
- Others ?

# **Observations**

- **Based on this information informed decisions on the following should be possible:**
- **Are the correct tests for toxic contaminants being performed?**
- **Is DESC Confined Space Respiratory Protection Policies adequate?**
- **Is Respiratory Protection necessary? If so, what type?**
- **Is medical surveillance adequate?**

# **Acceptable Test Results**

## **Toxic Gas: Jet Fuel**

- **ACGIH: TLV's**
- **OSHA: PEL's (ACGIH TLV's 1962)**
- **USAF: OEL's (1995 Jet Fuel)**
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- **ACGIH TLV (30 ppm) Ceiling (150 ppm)**
- **OSHA PEL (None)**
- **OEL: (30 ppm) STEL (249 ppm)**

# Acceptable Test Results

## Toxic Gas: Jet Fuel / Diesel Fuel

- Jet Fuel TLV = 30 ppm (TWA)
- Jet Fuel Ceiling = 150 ppm
- Jet Fuel RP = 150 to 300 ppm
- **Above 300 ppm: NO ENTRY**
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- Diesel Fuel TLV = 15 ppm (TWA)
- Diesel Fuel Ceiling = 75 ppm
- Diesel Fuel RP = 75 ppm to 150 ppm
- **Above 150 ppm: NO ENTRY**

# Preliminary PID Test Results

• Activity	Peak Range	Ceiling
• Shore Tank Gauge	* <u>239 - 104</u> ppm	<u>150 ppm</u>
• Laboratory	90 ppm	
• Shore Tank Entry	* <u>287 - 73</u> ppm	<u>150 ppm</u>
• Barge Discharge	13 ppm	
• Tanker Discharge	8.9 ppm ?	
• Rail Car	* <u>162 - 102</u> ppm	<u>150 ppm</u>
• Truck Loading	* <u>104 - 76</u> ppm	
• TWA (All Activities) < 1ppm		
• Peak Exposures Avg. 68.3 ppm		

# Secondary

• Activity	Peak Range	Ceiling
•		
• <b>Shore Tank Gauge</b>	<b>*<u>221 - 56 ppm</u></b>	<b><u>150 ppm</u></b>
• <b>Laboratory</b>	<b>90 ppm</b>	
• <b>Shore Tank Entry</b>	<b>*<u>256 - 73 ppm</u></b>	<b><u>150 ppm</u></b>
• <b>Barge Discharge</b>	<b>13 ppm</b>	
• <b>Tanker Discharge</b>	<b>8.9 ppm ?</b>	
• <b>Rail Car</b>	<b>*<u>136 - 82 ppm</u></b>	<b><u>150 ppm</u></b>
• <b>Truck Loading</b>	<b>*<u>101 - 76 ppm</u></b>	
• <b>TWA (All Activities) &lt; 1ppm</b>		
• <b>Peak Exposures Avg. 63.5 ppm</b>		

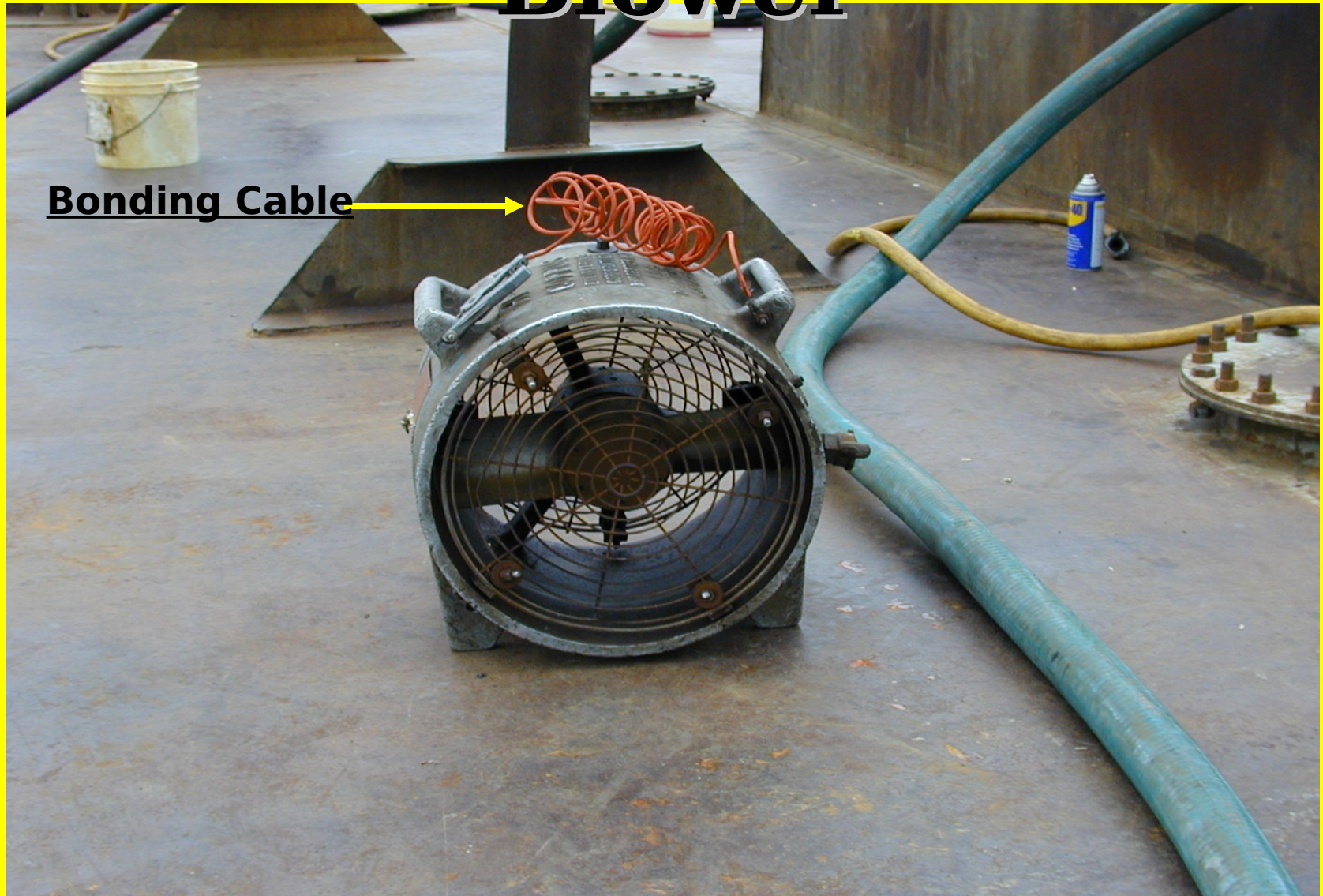
# Conclusions

- **556 workplace activities were monitored**
- **TWA for all activities was less than 1 ppm.**
- **Only 4% of the activities had peak exposures that exceeded the ACGIH Ceiling, WHY?**

# Conclusions

- **TWA: Seems OK (less than 1 ppm)**
- **Peak Exposures indicate areas of concern (4%)**
  - **Reasons**
- **Poor monitoring techniques**
- **Bad work practices**
- **Fuel Tanks inside mountains, manual mixing of additives! (Red Flags)**

# Turbine: Fresh Air Blower



# **Respiratory Protection - SAR Airline Respirators**



# **Respiratory Protection Requirements (29 CFR 1910.134)**



- **Written program**
- **\*Test workplace**
- **Train users (fit test, breakthrough) (Doc.)**
- **Cleaning, Sanitation (Doc.)**
- **Maintenance (Doc.)**
- **Enforce**
- **Medical Surveillance Annual**

# Summary

- Worker exposures did not exceed the ACGIH TLV in 100% of monitored activities.
- Worker exposures did not exceed the ACGIH Ceiling in 95% of monitored activities.
- Worker exposures above the ACGIH Ceiling were due in large part to unacceptable monitoring or poor work habits.
- About 1% of work activities exceed the ACGIH Ceiling and require mandatory use of Respiratory Protection.



# Respiratory Protection Fit Testing

## Positive/Negative Atmosphere Challenge



# **Purpose of Training**

- **Confined Space Training**
- **Multi Rae / Toxi Rae Training**
- **Lock out / Tag out Training**
- **Results of Jet Fuel / Diesel Fuel Exposure Monitoring**
- **Respiratory Protection Fit Testing**
- **Slips, Trips, Falls**

# News Paper Article

## Three bodies are found in ship's hold in LaPlace

*Customs inspector, crew members dead*

By Lolly Bowean  
River Parishes bureau

A U.S. Customs inspector, a ship captain and shipmate were found dead Tuesday morning inside a foreign vessel delivering scrap metal to Bayou Steel in LaPlace, authorities said.

St. John the Baptist Parish Sheriff's Office investigators think the three men suffocated shortly after entering a closed lower section of the ship that was filled with scrap metal. The 214-foot ship, Sakura I, sailed from the Dominican Republic and is registered in Panama. Authorities didn't know how many people worked aboard the vessel.

"It looks like they went into an area where there was no oxygen," said Capt. Mike Tregre, a spokesman with the Sheriff's Office. "They passed out and lost consciousness."

Officials are still investigating the incident and are awaiting the results of autopsies conducted Tuesday. Foul play is not suspected, Tregre said.

The incident also is under investigation by U.S. Customs officials.

The customs worker was identified as Senior Inspector Thomas M. Murray, 52, of Gramercy, who was searching the ship for contraband or stowaways. Authorities would not release the names of the captain or shipmate because their relatives had not been notified.

Officials at Nord-Sud Shipping Inc., the Lusher company that represents the ship, would not comment on the matter.

U.S. Customs authorities said Murray and another inspector boarded the ship Tuesday at about 2:30 a.m. after the vessel docked at Bayou Steel.

Murray was inspecting a closed-off portion of the ship when his partner lost radio communication with him, authorities said.

The ship's captain went to

look for Murray but never returned, Bayou Steel President Jerry Pitts said. A shipmate then went to look for the two men, and when he didn't return, the Sheriff's Office was called, Pitts said.

Wearing breathing equipment, firefighters from the LaPlace Volunteer Fire Department recovered the bodies at 3 a.m. Officials couldn't say how long the men were in the closed-off portion before they died.

Murray's U.S. Customs partner and another shipmate were taken to River Parishes Hospital after the incident. One of the men was treated for nausea and a headache resulting from fumes in the closed cargo area, and the other was examined because he came in contact with fluids from the three bodies, hospital representatives said. Authorities would not release their names.

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